Remarks

This is in response to the Office Action dated April 16, 2007.

A. Claims 1 and 13 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter of the present invention.

Claims 1 and 13 were also rejected under 35 U.S.C. 103(a) as being unpatentable over Rochester, Jr. et al (US Patent No. 5,687,175) in view of Steeves (US Patent No. 6,570,487) and Hassett et al (US Patent No. 5,406,275).

In consideration of these rejections, claims 1 and 13 have been amended to contain the feature of "an on-vehicle device positioned in a standard communication area is able to respond to the polling signal many times and to communicate with a road-side device", the feature of "second means or a road-side device receives a plurality of responses of a single on-vehicle device without receiving another signal in the on-vehicle device", and the feature of "it is decided that the on-vehicle device is now positioned in the standard communication area when the second means or the road-side device receives the plurality of responses".

As amended, it is believed that claims 1 and 13 are now devoid of any indefiniteness problems. It is therefore respectfully submitted that the 35 U.S.C. 112, second paragraph rejection has been overcome.

Hereinbelow are the differences between the present invention as defined by amended claims 1 and 13 and the combination of Rochester, Steeves and Hassett.

In Steeves, a tag transmits a packet of data to a reader in response to a request from the reader and checks for an acknowledgment signal from the reader. If the

acknowledgment signal indicates that the data packet was received in the reader, the tag transmits additional packets to the reader in the same manner. If the acknowledgment signal is not received in the reader, the current packet is retransmitted to the reader (column 3, lines 65-67, and column 9, lines 23-35). Therefore, the reader receives the current packet only once. When the reader transmits an acknowledgment signal to a tag, the tag transmits another tag each time the reader transmits an acknowledgment signal.

In contrast, in the present invention, when an on-vehicle device receives a polling signal from a road-side device, the on-vehicle device transmits a plurality of responses to the road-side device in response to the poll signal without receiving another signal from the road-side device. That is, the on-vehicle device outputs a plurality of responses in response to a single signal from the road-side device. Steeves fails to teach or suggest the on-vehicle device outputting a plurality of responses in response to a single signal.

Further, in the present invention, when an on-vehicle device passing a quasi communication area is placed or positioned in a standard communication area, the on-vehicle device can respond to a polling signal and can communicate with a road-side device. When the road-side device receives a plurality of responses of the on-vehicle device to the polling signal, the road-side device decides that the on-vehicle device is now positioned in the standard communication area without using any sensor for detecting the on-vehicle device, and the road-side device starts a communication with the on-vehicle device positioned in the standard communication area.

Rochester, Steeves and Hassett fail to teach or suggest the detection of an on-vehicle device positioned in a standard communication area without using any sensor.

B. Claims 2 and 14 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rochester, Jr. et al (US Patent No. 5,687,175) in view of Tsuda (US Patent No. 5,933,096) and Hassett et al (US Patent No. 5,406,275).

In response to this rejection, claims 2 and 14 have been amended to contain the feature of "an on-vehicle device of a vehicle placed in a standard communication area is able to communicate with a road-side device", and the feature of "the road-side device decides that the on-vehicle device is now placed in the standard communication area when both first and second vehicle sensors detect the vehicle, and starts a communication with the on-vehicle device placed in the standard communication area".

Herein are the differences between the present invention as defined by the amended claims 2 and 14 and the combination of Rochester, Tsuda and Hassett are described.

In the present invention, an on-vehicle device of a vehicle can reliably communicate with a road-side device when being placed or positioned in a standard communication area. A first vehicle sensor first detects that the on-vehicle device is placed in the standard communication area or a quasi communication area, and a second vehicle sensor detects that the on-vehicle device is placed in the standard communication area. Therefore, when both the sensors detect the vehicle, the road-side device can reliably detect that the on-vehicle device is placed in the standard communication area. Accordingly, the on-vehicle device can reliably communicate with the road-side device.

Further, because the transmission of a polling signal is started when the first vehicle sensor detects the vehicle, the polling signal can efficiently be detected by the on-vehicle device.

Tsuda discloses a toll collection system. In this system, an entry sensor 12 and an exit sensor 14 are installed, and a toll collection area 10 is placed between the sensors. The entry sensor 12 detects that a vehicle has entered the toll collection area 10. The exit sensor 14 detects that the vehicle has left the toll collection area 10 (column 4, lines 26-31). Hassett discloses apparatus for the determination of the location of a vehicle. In this apparatus, a transponder 28 of the vehicle 12 is inactive as it approaches an antenna field

26 of a transmitting unit 18. As the vehicle enters the field 26, an early warning signal detection unit 78 detects the vehicle, and the transponder 28 begins processing signals received from the vehicle (column 8, lines 13-18).

Although Tsuda discloses two sensors to detect the vehicle entering and leaving a toll collection area, Tsuda fails to teach or suggest two sensors detecting a vehicle placed at a specific position at which the vehicle can reliably communicates with a toll station 26.

Hassett teaches only a single sensor (i.e., early warning signal detection unit 78) detecting the vehicle entering the field 26. Therefore, Hassett also fails to teach or even suggest two sensors detecting a vehicle.

Applicant therefore respectfully submits that the combination of Rochester, Tsuda and Hassett fails to render obvious the claimed subject matter of claims 2 and 14.

C. Claims 5-8, 16, 17, 21, 22, 26 and 27 were rejected under 35 U.S.C. 103(a) as being unpatentable over Rochester, Jr. et al (US Patent No. 5,687,175) in view of Nagura et al (US Patent No. 5,963,149).

In response to these rejections, claims 5, 7, 16 and 17 have been amended to contain the feature of "received data is handled as effective data in response to the reception of a communication end signal, and a communication is ended", and the feature of "the received data is handled as effective data when the communication end signal is not received, and a communication is ended".

Herein are the differences between the present invention defined by the amended claims 5, 7, 16 and 17 and the combination of Rochester and Nagura.

In the present invention, when an on-vehicle device (or road-side device) receives the communication end signal from the road-side device (or on-vehicle device), data

received by the on-vehicle device (or road-side device) is handled as effective data. Further, when the on-vehicle device (or road-side device) does not receive the communication end signal, received data is handled as effective data. Therefore, data received by the on-vehicle device (or road-side device) is handled as effective data regardless of whether the communication end signal is received. Accordingly, it is possible to prevent the occurrence of a disagreement in the phase of signal processing between the road-side device and the on-vehicle device.

In contrast, Rochester teaches that sensors not successfully receiving an acknowledge packet signal continue to respond to poll packets (column 6, lines 29-30). Nagura discloses a communication system. In this system, a transceiver 15 transmits an interrogation signal for performing toll collection processing. Upon receiving the interrogation signal, a response unit 13a transmits an interrogation response signal. Upon receiving the interrogation response signal, the transceiver 15 transmits a termination signal. Upon receiving the termination signal, the response unit 13a transmits a termination response signal. Upon receiving the termination response signal, the transceiver 15 completes its communications (column 6, lines 25-41).

Even though Nagura may teach or suggest communication end signal, the combination of Rochester and Nagura fails to teach or even suggest data handled as effective data in response to the reception of a communication end signal or in response to no reception of a communication end signal.

For the above reasons, it is respectfully submitted that amended claims 1 and 13 are clearly distinguishable from the teachings of Rochester in combination with Steeves and Hassett, that amended claims 2 and 14 are clearly distinguishable from the teachings of Rochester in combination with Tsuda and Hassett, and that amended claims 5, 7, 16 and 17 are clearly distinguishable from the teachings of Rochester in combination with Nagura. The rejections under 35 U.S.C. 103(a) are therefore respectfully requested to be withdrawn.

Respectfully submitted,

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